MDOT PLOWS ON EASTBOUND M-43 IN SOUTHWEST REGION

# The Field Report

March 2013

IN THIS ISSUE



***Mission: Providing economic benefit and improved quality of life through efficient operations, quality construction and innovative research***

# Welcome to the OFS Newsletter!

by Mark Geib, Engineer of Operations Field Services

Welcome to the premiere issue of *The Field Report*, the Operations Field Services (OFS) Division Newsletter. Our goal is to keep you informed of our initiatives here at OFS with regard to achievements and developments in the areas of best practices, innovation, cost savings, and procedural changes that provide statewide alignment. This newsletter is intended to highlight our initiatives and give readers a better understanding of who we are, the support we provide to regions, and how our services can help the department achieve value-added results.

## Taking Stock

I can't help but think back to where we were as a department when I started with the Michigan Department of Transportation (MDOT) over 22 years ago, and where we are today. Who would have thought we'd be monitoring systems that not only track the health of our infrastructure but also measure system performance for improved operations? Advancements in technology challenge us to improve our business practices so that we can meet or exceed our customers' expectations. Through carefully selected partnerships, seeking our fit with best practices, and leveraging technology and innovation for process improvement, we have achieved efficiencies that were only dreamed of 20 years ago.

However, use of technology and innovation within an organization only exists with a well prepared and trained workforce that's willing to embrace and visualize what improvements can be gained to achieve operational proficiency. At OFS, we have built an organizational structure that aligns our resources around innovation, while meeting the needs of our internal and external customers. From an operations field service standpoint, we have also looked at which areas in the department fit together and achieve coordinated outcomes for the regions.

## OFS Sections

The OFS Division manages three sections: Bridge Field Services, Intelligent Transportation Systems (ITS) and System Operations & Maintenance Field Services.

- Bridge Field Services manages and coordinates structural technical investigations, fabrication, structures laboratory testing, bridge construction support, bridge inspections, emergency repairs, reach-all crew, general bridge CPM and sign fabrication. Bridge inventory and load rating has been combined with the Bureau of Development under the Bridge Development Section to better align resources with design programs.

- Operationally, we have truly reinvented ourselves by expanding our ITS Program Office staff to support increased needs for program expansion and architecture layout, advancement of Connected Vehicle deployments and the use of data generated by these deployments. Our System Operations Section supports work zone safety and incident management, congestion/mobility, traffic signals (analysis, design, and construction) and the Statewide Transportation Operations Center (STOC). The Operations Section develops and supports several important initiatives. We manage work zone fatality/injury data for the Michigan Dashboard, performance measure evaluations for 4DX WIG sessions, training, traffic simulation/modeling (SYNCHRO, VISSM, HCS) and the Commercial Vehicle Enforcement program. The Operations Section also manages and provides technical support for RITIS (Regional Integrated Transportation Information System) a Web-based system that integrates MDOT's traffic, incident, construction, weather data and other traffic information for performance measure reporting and analysis. RITIS provides measureable outcomes for the statewide 4DX initiative WIG for "User Delay Cost (UDC)".
- Within our Maintenance Services Section we continue to support the regions needs with training, best practices, applied use of technology/innovations, studies/evaluations, policy/procedures, contracts and mechanical maintenance support.

## Going Forward

The OFS Division has been organized to meet the growing field operational needs of our transportation system. We continually strive to be a Center of Excellence, assure statewide alignment, and seek the use of best practices to gain continuous improvements and efficiencies that make us better, faster, cheaper, safer and smarter. We work to reflect our department values, implement our vision and align with our mission. Our goal is to maximize customer satisfaction and achieve a clear understanding as to how we support improved quality of life for the citizens of Michigan within the safest environment possible.

Looking into the future, soon it will be possible for data to be transmitted between vehicles and from the roadside to the vehicle. We may have aerial vehicles providing scanned data via LIDAR or some other sensing device that provides complete inspections of our infrastructure without jeopardizing employee safety and customer mobility. Our assets will talk to us and tell us when they're feeling sick. We'll measure performance of not only our infrastructure but those that construct and manage it for us. To that end, we will have to reinvent ourselves once again to fit our ever changing societal and environmental needs. We hope you enjoy this premiere issue of *The Field Report* and invite your comments.

# Zilwaukee Bridge Bearing Replacement

In April, MDOT will begin a $35 million rehabilitation project at the Zilwaukee Bridge in Saginaw County. The two-year project is scheduled for completion in April 2015 and will replace 102 pier bearings, 34 expansion bearings and 10 abutment bearings. It also will consist of deck repairs to the latex-modified overlay, barrier wall repairs, electrical and lighting upgrades and sealing the deck with an epoxy healer sealer.

Due to the complexity of this project, innovative contracting in the form of a Construction Management/General Contracting (CM/GC) was used. This type of contracting fosters early communication with designers and contractors while minimizing risk. The contractor/consultant team of PCL Constructors Inc. /Corven Engineering was selected for the project. T.Y. Lin was chosen for the design and Janssen and Spaans utilized for independent engineering. Project oversight will be conducted by the Bay City TSC with statewide assistance provided by Bridge Field Services.

Challenges associated with this project include:

- Jacking approximately 15 million pounds for pier bearing replacement
- Multiple jacking schemes to account for various pier/segmented box girder configurations
- Traffic control to accommodate closure of one bound of I-75
- Limited allowable space for expansion bearing replacement
- Limiting the amount of concrete coring to mitigate risks associated with cutting reinforcing steel and steel tendons

*Typical Pier Bearing*

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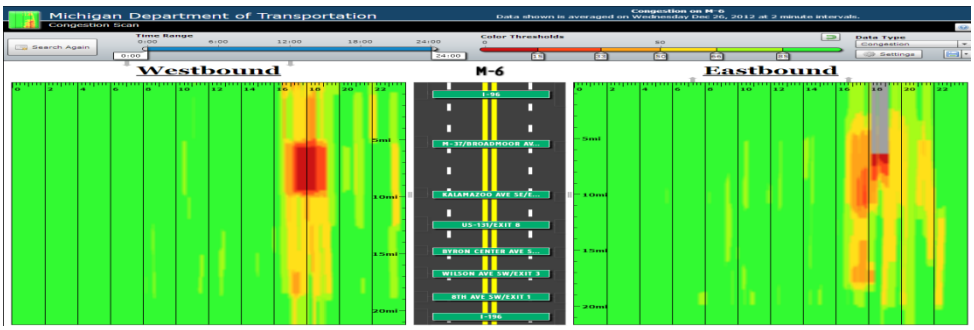
# Regional Integrated Transportation Information System

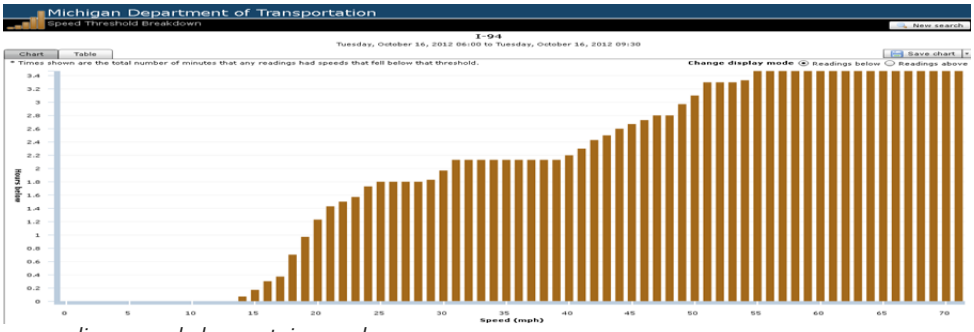
The Regional Integrated Transportation Information System (RITIS) is a Web-based system that integrates MDOT's traffic, incident, construction, weather data and other traffic information for performance measure reporting and analysis. Some of the tools include:

- A congestion scan can be performed to see when, where and how significant incidents or construction can impact traffic. Below is an example of an incident that occurred on December 26, 2012 on EB M-6.




*This graphic shows how WB traffic was also affected even though the incident was in the EB lane.*

- Animated speed maps can be created to demonstrate how traffic responded to events. Various traffic conditions and patterns can be viewed, e.g., average speed and travel time by time of day.




*This graphic shows how many readings were below certain speeds.*

- The system can calculate user delay costs and break it down by hour. This feature is being utilized by most regions to track user delay costs seen by the traveling public.

Combined passenger and commercial delay costs

| | 12 AM | 1 AM | 2 AM | 3 AM | 4 AM | 5 AM | 6 AM | 7 AM | 8 AM | 9 AM | 10 AM | 11 AM | 12 PM | 1 PM | 2 PM | 3 PM | 4 PM | 5 PM | 6 PM | 7 PM | 8 PM | 9 PM | 10 PM | 11 PM | Daily Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/06/13 | $0.5K | $0.2K | $0.1K | $0.1K | $0K | $0K | $0.1K | $0.1K | $0K | $0K | $0K | $0K | $0K | $0K | $0K | $0.1K | $0.3K | $0.1K | $0.7K | $0.1K | $0K | $0.1K | $0.1K | $0K | $2.8K |
| 1/07/13 | $0K | $0K | $0K | $0K | $0K | $0K | $0.1K | $11K | $13.3K | $0.8K | $0K | $0K | $0K | $0K | $0.7K | $4.1K | $11.2K | $20.3K | $5.3K | $0K | $0K | $0.1K | $0.1K | $0.1K | $67.4K |
| 1/08/13 | $0K | $0K | $0K | $0K | $0K | $0K | $0.3K | $7.2K | $9.7K | $2.6K | $3.6K | $1.3K | $1.8K | $3.1K | $0.2K | $1.4K | $5K | $16.9K | $2.6K | $0.4K | $0.1K | $0K | $0K | $0.1K | $56.5K |
| 1/09/13 | $0K | $0K | $0K | $0K | $0K | $0K | $0.2K | $11K | $20.3K | $3K | $2.6K | $4.1K | $5.4K | $12.3K | $3.5K | $8.4K | $24.3K | $36.6K | $10.2K | $1.5K | $0K | $0K | $0K | $0.1K | $143.7K |
| 1/10/13 | $0K | $0K | $0K | $0K | $0K | $0K | $0.5K | $10.8K | $13K | $7.6K | $3.3K | $2.9K | $1.2K | $0.5K | $0.4K | $0.4K | $6.5K | $17.7K | $5.7K | $0K | $0K | $0.1K | $0.1K | $0K | $70.8K |
| 1/11/13 | $0K | $0.3K | $0.3K | $0.5K | $1.3K | $1K | $3.5K | $44.7K | $43.4K | $9K | $1.1K | $3.9K | $0.5K | $0.5K | $0.4K | $5.3K | $15.3K | $18K | $3.1K | $0.1K | $0.1K | $0K | $0K | $0K | $152.4K |
| 1/12/13 | $0K | $0K | $0K | $0K | $0K | $0K | $0K | $0.1K | $0K | $0.2K | $0.1K | $0.1K | $0K | $0.1K | $0.1K | $0K | $0K | $0.1K | $0.1K | $0K | $0K | $0K | $0.1K | $0K | $1.2K |
| Hourly Totals | $0.7K | $0.7K | $0.5K | $0.7K | $1.4K | $1.1K | $4.8K | $84.9K | $99.6K | $23.2K | $10.7K | $12.3K | $9K | $16.5K | $5.3K | $19.7K | $62.8K | $109.7K | $27.6K | $2.1K | $0.3K | $0.4K | $0.5K | $0.3K | Grand Total $494,713 |

*This graphic tracks a week in downtown Detroit in January with almost $500,000 in user-delay costs.*

- Statewide bottleneck rankings can be developed. These rankings factor in average duration, average length of queue and the number of occurrences.

RITIS is capable of these and many other functions to aid in performance measure reporting and analysis. RITIS is available to all MDOT employees. Check it out and explore at www.ritis.org/login.

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# Strengthening Timber Bridges

The US-2 Roadside Park Bridge, near Naubinway was constructed in 1990 with a superstructure comprised of 2 inch by 12 inch nail-laminated timbers. During a routine bridge inspection, it was observed that the structure was deflecting more than what the inspector expected. On November 8, 2011, the Superior Region conducted a load test with a 2,000-gallon water truck. Under this load the bridge deflected 3/4 inch at midspan. This deflection was seen as unacceptable and the Region Bridge Support Unit was then contacted for assistance.

Nail-Laminated timber bridges lose strength over time. After 21 years of repeated loading from trucks, the nails holding the timbers together were backing out. As the nails backed out, the bridge grew in width. This growth in width gradually reduced the structure's ability to carry loads, and increased deflections. In fact, the width of the bridge had grown from 24 feet to 24 feet, 2 inches wide.

After consulting several research reports and methods for strengthening nail laminated timber bridges, a "belt and suspender" repair method was developed. In September of 2012, the Region Bridge Support Unit installed external post tensioning on the bridge, and squeezed the bridge back down to 24 feet wide, and then placed cross ties to prevent future widening. Upon completion of construction, the bridge was once again load tested with the same 2,000-gallon water truck. During this test, the bridge deflected 3/8 inch, representing a 50 percent reduction in deflection.

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# Maintenance Services Roadside Operations

Maintenance Services Roadside Operations is organizing a one-and-a-half-day vegetation management training session for MDOT's 62 Certified Pesticide Applicators, several maintenance supervisors, and Resource Specialists. The training will be held at the Lansing Community College West Campus auditorium on April 16 and 17, 2013.

All professional herbicide applicators are required to be certified by the Michigan Department of Agriculture and Rural Development (MDARD). This training is approved by MDARD for credits toward the applicator's recertification. Credits have been granted for all application categories held by MDOT applicators. By attending this training applicators will maintain their certifications. In addition to receiving MDARD credits, the training will ensure alignment with MDOT's Integrated Roadside Vegetation Management (IRVM) practices.

***Broadcast Spray Operation***

The role of herbicides and other MDOT IRVM techniques will be presented so best practices can be implemented consistently statewide. Topics covered include: safe herbicide handling and application, regulatory requirements and updates, region best practices, the use of plant growth regulators, and invasive weed issues.

By keeping our applicators in tune with industry and national best practices, this training supports MDOT's continuing commitment to protect the environment, work safely and increase the productivity of our processes using new and innovative practices.

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# Commercial Vehicle

The System Operation Congestion/Mobility unit manages the statewide Commercial Vehicle Program. The goals of the program are to protect highway infrastructure and enforce the laws of the state through implementation of targeted commercial vehicle enforcement opportunities. This is done via a collaborative partnership between MDOT and the Michigan State Police. The common enforcement tools used are:

- Weigh Stations
- Weigh-in-Motion
- Permanent Intermittent Truck Weigh Stations
- Wireless Truck Weight Monitoring
- Safe Enforcement Sites

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*Portable Scales*

Statewide Transportation Operations Center (STOC)

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# Statewide Transportation Operations Center

The Statewide Transportation Operations Center (STOC) is here to help! Whether it's checking traffic conditions along state trunklines, verifying traffic incidents using freeway cameras, updating information on the Mi Drive Web site, or displaying a message for motorists on a Dynamic Message Sign (DMS), we are available to assist at any time of the day or night.

STOC has already built strong working relationships with many MDOT garages, TSCs, and region offices, and we welcome and encourage everyone within MDOT and our partner agencies to utilize the services STOC has to offer. Through these partnerships, STOC can utilize MDOT's investment in technology to increase first responder safety, and decrease the delay, cost, and inconvenience experienced by our customers when they encounter incidents on our roadways. STOC can be reached anytime by e-mailing MDOT-STOC@michigan.gov or by calling 517-241-4000. We look forward to working with you soon!

# Performance-Based Operational System

On October 26, 2011, Governor Snyder issued a special message encouraging Michigan residents and legislators to reinvest in Michigan's infrastructure to keep Michigan competitive in today's global economy. The Governor's message, titled "Reinventing Michigan's Infrastructure: Better Roads Drive Better Jobs," challenged the Michigan Department of Transportation to change the way it does business in a fiscally constrained environment.

The Governor proposed a number of reforms to MDOT business practices, including using a performance-based operational system (PBOS) for managing and maintaining highways to improve efficiency in the preservation of Michigan's roads and bridges and save taxpayers money. He also asked MDOT to gain innovation and efficiencies by considering opportunities for competitively bidding for maintenance services.

In the fall of 2012 MDOT entered into a contract with KPMG LLP to investigate national and international PBOS initiatives that currently exist and recommend how MDOT could utilize PBOS within our existing processes. Draft recommendations are currently being reviewed by project personnel and other MDOT leadership for consideration.

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# Property Damage Reclamation Process

The Maintenance Services Section manages the Property Damage Reclamation Process (PDRP). This process is used to track crashes that cause damage to state property such as traffic signs, traffic signals, guardrail, median cable barrier, fences and bridges. When damage is identified, MDOT attempts to recover the cost of the repairs from the individual(s) responsible for the crash or from their insurance company.

The money collected through PDRP is retained by MDOT as State Trunkline Fund revenue, with the Federal Highway Administration matching four dollars to every one dollar collected. These funds are used for highway projects and maintenance operations. MDOT is committed to recouping damage claims before the one-year deadline.

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# OFS Training and Important Events

- March 19th & 20th—Michigan Bridge Conference
- March 20th thru 22nd—Michigan Traffic & Safety Summit
- April 16th & 17th—Vegetation Management
- April 20th thru 24th —ITS America 23rd Annual Meeting
- May 17th thru 20th—AASHTO Spring Conference
- May 30th—ITS Michigan Annual Meeting / Exhibition
- October 16th & 17th—Winter Operations Conference

# In the next issue of The Field Report:

- MDSS / IMO 2.0
- Salt Bounce and Scatter Study
- Chemical Storage Facility Program
- Tow Plow Research Study
- Pile Welding
- Use of Carbon Fiber
- Bottleneck Reduction
- Adaptive Signal Control Technologies

Questions/Comments?
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*Tow Plow*